IRRIGATION PIT OR REGULATING RESERVOIR (No.)

Irrigation Pit

Definition

A small storage reservoir constructed to regulate or store a supply of water for irrigation.

Scope

This standard includes open pits excavated below the ground surface to intercept and store either surface water or unconfined groundwater for irrigation. It applies to pits if part of the water is impounded above natural ground, provided that the depth of water above the ground surface, as measured at the spillway crest elevation, does not exceed 3 feet. This standard establishes the minimum acceptable level for the planning and functional design of irrigation pits. It does not include detailed criteria or construction specifications for individual pits or components of the storage facility.

Purpose

To collect and store water until it can be used beneficially to satisfy crop irrigation requirements.

Conditions Where Practice Applies

A. This practice applies only to sites meeting all of the following criteria and conditions:

1. The existing water supply available to the irrigation area is insufficient to meet conservation irrigation requirements during part or all of the irrigation season, or the irrigation pit will significantly reduce the energy requirements of the total water-supply system.

2. The construction of an irrigation pit is the most practical means of developing the needed additional supply of water.

3. An adequate supply of good quality water is available for storage from surface runoff, streamflow, or from a subsurface source.

4. Topography, geologic, water table, and soils conditions at the site are satisfactory for the feasible development of the irrigation pit.

5. Where surface runoff enters the pit, the contributing drainage area is or can be protected against erosion to

the extent that normal sedimentation will not materially shorten the planned life of the pit.

6. The contemplated excavation of the pit and storage of water are permitted by applicable Nebraska state and local laws and regulations.

Design Criteria

A. Site Selection: Site selection shall be such that:

1. An adequate dependable storage capacity (depth and volume) can be provided to meet water supply and reservoir location requirements.

2. Soils area will be adequately impervious to prevent seepage losses that will jeopardize the water supply, or the soils shall be of such a nature that sealing is practicable.

3. The peak rate of runoff that can be expected to occur once in 25 years can be safely bypassed around or over the reservoir area without erosion or severe damage to the reservoir.

B. Capacity Requirements

Irrigation pits shall be designed to have a usable capacity sufficient to satisfy irrigation requirements in the design area throughout the growing season of the crop or crops being irrigated. In computing capacity requirements, due consideration shall be given to surface runoff, precipitation, evaporation and seepage. Additional capacity shall be provided as necessary for sediment storage. The usable capacity of a pit that depends wholly on groundwater as a source of supply shall be that portion of the pit that is below the static water level.

C. Side Slopes

Side slopes of irrigation pits shall be no steeper than those required to maintain slope stability in the type of material encountered.

D. Inlet Protection

Where surface runoff enters the pit through a natural or excavated channel, the side slope of the pit shall be protected against erosion by the use of a suitable structure.

E. Embankment and Spillway Requirements

Where irrigation pits supplied by surface runoff are located on sloping terrain, and a portion of their capacity is impounded against an embankment, the embankment shall be designed to comply with the Standard for POND (378) and a suitable spill-way shall be provided to safely pass excess storm runoff either around, through, or under the embankment. The capacity of the spillway shall be not less than that required to accommodate the peak rate of runoff that can be expected once in 25 years.

F. Placement of Waste Material

Waste material excavated from the pit shall be placed or disposed of in such a manner that its weight will not endanger the stability of the pit side slopes and where it will not be washed back into the pit as a result of rainfall. To accomplish these objectives, the waste material shall be placed in one of the following ways:

1. Uniformly spread to a height not exceeding 3 feet with the top surface graded to a continuous slope away from the pit. In such cases no berm is required.

2. Uniformly stacked with side slopes assuming the natural angle of repose for the excavated material behind a berm equal in width to a maximum depth of the pit but not less than 12 feet. The maximum height of the waste bank shall not exceed 12 feet.

3. Removed from the site and utilized elsewhere.

G. Outlet Works

Suitable outlet works shall be provided for the controlled release of irrigation water. The capacity of the outlet works shall be no less than that required to provide the outflow rate needed to meet peak period irrigation system demands.

Plans and Specifications

Plans and specifications for irrigation pits shall be in keeping with the preceding standard and shall describe the requirements for proper installation of the practice to achieve its intended purpose.

Construction operations shall be done in such a manner that erosion and air and water pollution will be minimized and held within legal limits. The completed job shall be workmanlike and present a good appearance.

Applicable specifications to be provided for each job will be selected from those listed in the index to Nebraska Construction and Material Specifications.